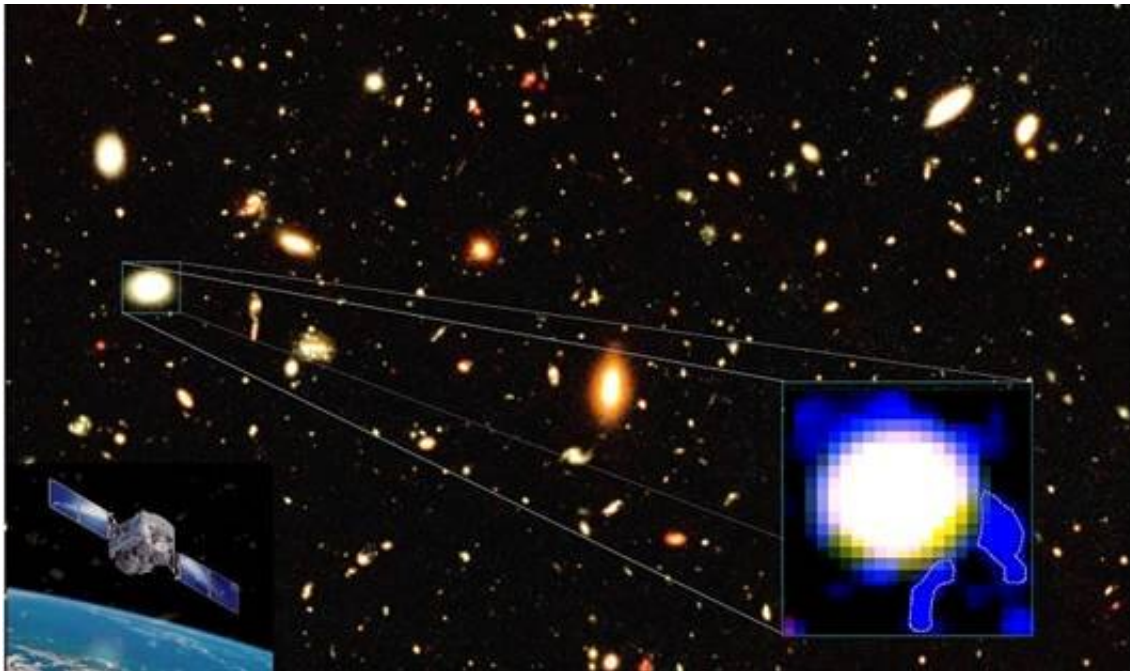


Formation of dwarf galaxy observed using India's AstroSat

August 1 2022, by Bob Yirka



The background is a 3-color optical image taken by the Hubble Space Telescope. The small box (left) shows a sample dwarf galaxy that was observed with the Ultraviolet Imaging Telescope on AstroSat. AstroSat detected extremely blue star-forming clumps on the galaxy's outer boundary (3-color UV-optical image shown in zoomed-in box). Credit: Ministry of Science & Technology, India

An international team of researchers has observed part of the formation of a dwarf galaxy, helping to explain how they evolve from a dwarf state to maturity. In their paper published in the journal *Nature*, the group describes finding evidence of maturation in such galaxies.

Prior research has shown that there are dwarf galaxies in the universe. Such galaxies are typically made up of just a few billion stars, as compared to mature galaxies such as the Milky Way, which have 200 to 400 billion stars. Prior research has also suggested that some dwarf galaxies might evolve to become more mature galaxies, but how that might happen has not been clear. In this new effort, the researchers focused the AstroSat space-based telescope on several blue compact dwarf galaxies, which are calculated to be approximately 1.5 to 3.9 billion light-years from Earth. The team then used the ultraviolet imaging telescope aboard AstroSat, which is India's first multi-wavelength space telescope, to look for evidence of star formation activity.

Prior efforts to observe [star formation](#) in dwarf galaxies have been hindered by their low luminosities, [small size](#) and the low mass of the objects they contain. These problems have been overcome with AstroSat due to the high resolving power of its [telescope](#) and because of its ability to capture multiple wavelengths of light at the same time, and also because it was fitted with UV deep field imaging technology.

In analyzing 17 hours' worth of data from AstroSat, the researchers found evidence of material moving from the outer edges of eleven dwarf galaxies inward toward the center. The researchers note that such accretions would lead to a buildup of material in the inner parts of the galaxy, which, they suggest, could lead to the creation of stars and other bodies, such as planets and moons. They further suggest that such material is likely pulled inward by torque from gas and stellar complexes.

The researchers suggest their observations are just one step toward understanding how [dwarf galaxies](#) evolve to become mature galaxies with many more [stars](#) in them.

More information: Anshuman Borgohain et al, Extended far-ultraviolet emission in distant dwarf galaxies, *Nature* (2022). [DOI: 10.1038/s41586-022-04905-9](https://doi.org/10.1038/s41586-022-04905-9)

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